Customer Expert Day

Unidentified Gas (UIG)

Summary

What is Unidentified Gas (UIG)

- The majority of gas consumed in Great Britain can be accounted for as it is metered and registered. However, some gas is lost from the system, or not registered, due to theft, leakage from gas pipes, consumption by unregistered supply points and other reasons.
- The gas that is off taken from the Local Distribution Zone (LDZ) System, but not attributed to an individual Supply Meter Point or accounted for as Shrinkage, is referred to as UIG.

Why is UIG such a hot topic?

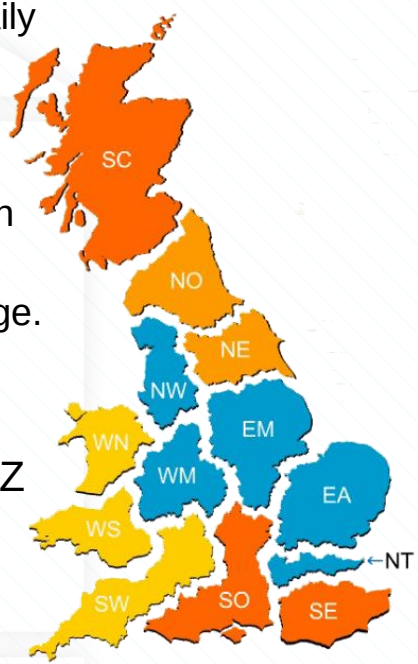
- The level of UIG can be volatile on a day to day basis, with calculated UIG values being unpredictable in nature.
- The lack of projected UIG values is financially impacting organisations within the industry and customers are looking to Xoserve for further support and knowledge.

How is UIG calculated?

What are the UIG Contributors & Calculations?

To calculate the Unidentified Gas there are several considerations

- Each LDZ is calculated independently of each other and is calculated on a daily basis.
- The input ↘ to each LDZ is from the NTS. This is known as **Total LDZ Energy.**
- Outputs ↗ are primarily what is consumed at supply points. These are broken down as **Total DM Energy** and **Total NDM Energy**.
- Gas can also be lost as part of the gas transportation activities, theft or leakage. Some of this is accounted for as **Shrinkage** and is also an output ↗.



At a high level, the daily calculation for Unidentified Gas (**UIG**) for each LDZ is:

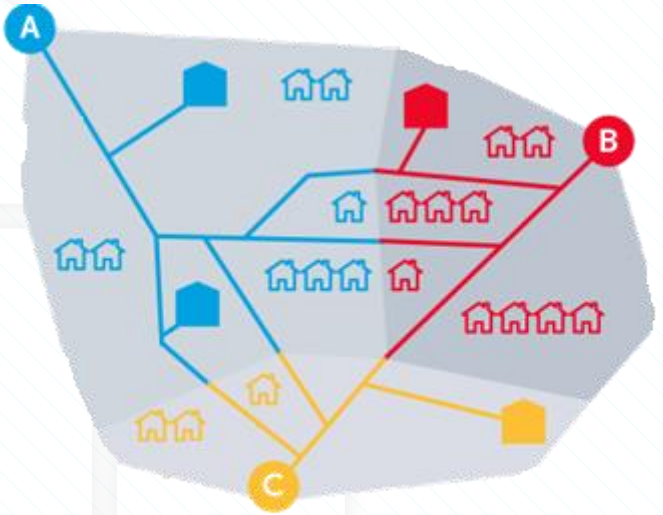
UIG = Known inputs ↘ – Known outputs ↗

What is Total LDZ Energy?

Input

Total LDZ energy is all of the energy entering an LDZ from the NTS.

LDZs usually have multiple gas input points, as shown in the diagram opposite



To provide the daily LDZ energy and display it in Gemini, National Grid collect readings from the measurement device at each input point. Using an aggregator tool they convert this to a total LDZ before publishing.

Net gas moved to/from storage and any net stock change within the LDZ also contribute to the Inputs to make up Total LDZ Energy.

For more information on offtake equipment see https://www.gasgovernance.co.uk/index.php/MER

Output

What makes up Total DM Energy?

DM Energy is the total energy for Class 1 & 2 sites**.** Reads received from Shippers and Daily Metered Service Providers (DMSP class 1 only) are used to calculate energy in Gemini and are simply added up to provide a Total DM Energy.


+

+

= Total DM Energy

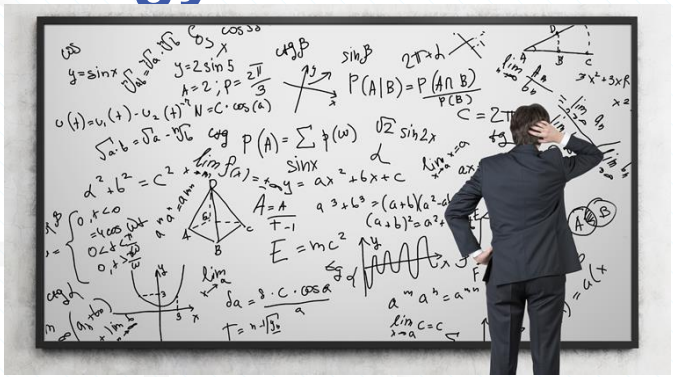
The accuracy of the DM figure relies on timely receipt of accurate data. With only a very small number of sites making up nearly 20% of the allocation, any inaccurate reads received could have a large impact on UIG.

What is Total NDM Energy?

DM Energy is the total energy for Class 3 & 4 sites.

As an individual AQ is available for every single supply meter point we can calculate & allocate energy each day and to each particular End User Category within LDZ.

The calculation is shown below and accuracy relies on the data being as accurate and up to date as possible.



Supply Meter Point Demand = (Rolling AQ/365) X ALP X (1+ (WCF X DAF))

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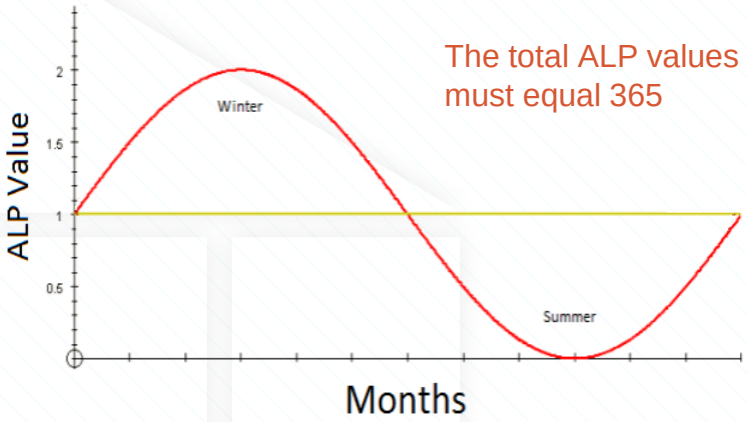
More information about NDM Energy Calculation

ALP ALP (Annual Load Profile) is the daily seasonal normal as a proportion of the average daily seasonal normal demand for the End User Category. If sites used the same energy every day then this figure would always be 1, each EUC has its own ALP Profile.



The total ALP values must equal 365

WCF The Weather Correction Factor is calculated for each LDZ using the Composite Weather Variable (CWV) minus the Seasonal Normal Composite Weather Variable (SNCWV).

DAF DAF is the Daily Adjustment Factor is the adjustment for weather sensitivity in the End User Category as a proportion of the seasonal normal.

What is Shrinkage?

Within each LDZ there is some expected losses of gas from the network. This is known as Shrinkage.

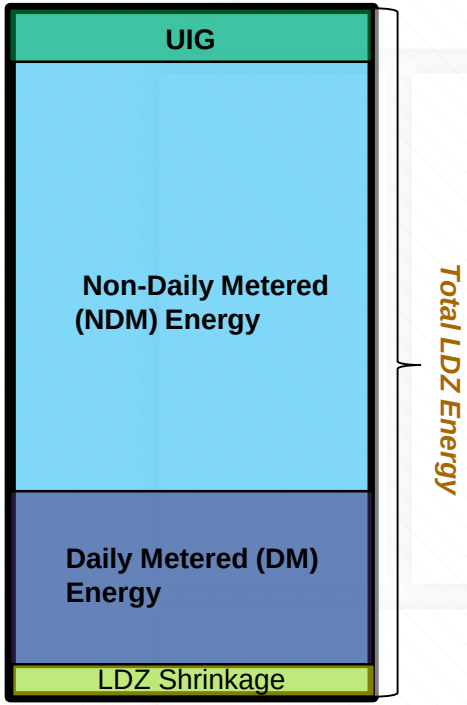
It is made up of three factors and is calculated by the Network Operators supported by the Industry Shrinkage Forum, these are:

- Leakage, with individual quantities being calculated at LDZ level
- Own Use Gas (used by the Transporters for transportation activities).
- Theft of Gas, which is gas stolen upstream of the meter with a single factor being applied across all LDZs.

How is UIG then calculated?

Now we are able to identify the majority of the energy passing through the LDZs we are left with a small % that is unidentified. The final calculation is:

UIG = Total LDZ Energy – DM Energy - NDM Energy – Shrinkage



This is calculated on a daily basis and is reported against a UIG meter in Gemini.

UIG is calculated per LDZ and then this allocated based on Class and EUC category.

How are UIG charges shared out?

How UIG is shared out?

- Due to the changes in gas settlement Project Nexus brought about, the industry agreed there was a requirement to fairly apportion the total UIG between classes and End User Category (EUC).
- To help with this, an **independent expert (AUG Expert)** helps the industry develop a methodology and provide a **table of weighting factors** that assigns the correct amount of UIG to different classes of meter points.
- The table of weighting factors is used in the daily gas nomination and allocation processes.
- Daily measured or estimated gas throughput in each LDZ is weighted using the AUG table factors to assign daily UIG to Shippers based on their throughput by meter point class and EUC.

For more information on the AUGE please refer to the following document
AUG Statement 2018/19

What is the Weighting Factors Table?

- There are 36 Unidentified Gas Weighting Factors, which are made up of nine EUC bands by four Classes*.
- The same factors apply to all Local Distribution Zones (LDZs)
- The Weighting Factors are published on the Joint Office of Gas Transporters website for each year.
- The total UIG for each LDZ, Class and EUC profile are weighted using a ratio calculation rather than a % calculation.

Supply Meter Point Classification	Class 1	Class 2	Class 3	Class 4
EUC Band 1	0.17	43.06	46.41	94.64
EUC Band 2	0.17	43.06	46.41	109.77
EUC Band 3	0.17	43.06	44.06	107.52
EUC Band 4	0.17	43.06	43.60	43.76
EUC Band 5	0.17	43.06	46.06	43.20
EUC Band 6	0.17	44.54	46.06	42.65
EUC Band 7	0.17	32.41	46.06	42.33
EUC Band 8	0.17	4.38	33.40	42.24
EUC Band 9	0.17	0.17	0.17	0.17

For information Weightings for each year please refer to the following document https://www.gasgovernance.co.uk/augenex

Worked example

UIG Calculation & Allocation example

At a high level we will look at how this all fits together. For this example we will assume 3 Shippers in one LDZ. All the values are representative of **energy**

Step 1 - Calculate total LDZ Energy

Step 2 - Calculate throughput for each Shipper

Step 3 - Calculate throughput for Total LDZ Energy

Step 4 - Apply weighting factors* to all Shipper throughput

Step 5 - Apply weighting factors* to Total LDZ Energy and total all weightings

Step 6 - Calculate weighted shipper throughput as a percentage

Step 7 - Apportion UIG.

* Weighting table used is example only and not reflective of any true data

Worked example

UIG Calculation & Allocation example

UIG = Total LDZ Energy – DM Energy - NDM Energy – Shrinkage

Total LDZ Energy	130,000	
Total DM Energy	39,440	
Total NDM Energy	70,220	
Shrinkage	13,800	
UIG	6,540	5.03%

Step 1 - The UIG for the LDZ is calculated using the above calculation. Which in the example equates to 6540 or 5.03% of the total.

Step 2 Calculate the throughput of a shipper (in the example we have titled Shipper A). The throughput is calculated by EUC and class.

Shipper A has a large domestic Portfolio with few Large Supply points & DM sites.

Shipper A

Throughput	Class 1	Class 2	Class 3	Class 4
EUC Band 1	0	0	2048	24384
EUC Band 2	0	0	2015	12441
EUC Band 3	0	0	1035	2541
EUC Band 4	0	0	1456	375
EUC Band 5	0	0	987	154
EUC Band 6	801	0	423	982
EUC Band 7	0	0	0	0
EUC Band 8	2758	0	125	0
EUC Band 9	2879	0	184	0

Worked example

UIG Calculation & Allocation example

Step 3 We calculate the Total LDZ throughput in the same way .

Total LDZ

Throughput	Class 1	Class 2	Class 3	Class 4
EUC Band 1	0	0	3072	36194
EUC Band 2	0	0	2869	14531
EUC Band 3	0	0	1174	5581
EUC Band 4	0	28	1504	580
EUC Band 5	578	154	987	1358
EUC Band 6	2811	985	423	1405
EUC Band 7	6035	452	50	36
EUC Band 8	14773	895	190	0
EUC Band 9	11304	1425	206	60

Step 4 Apply the weighting Factor table to the throughputs. The weighted throughput is calculated for each shipper.

Each Shipper is calculated independently of each other.

Shipper A

Weighted	Class 1	Class 2	Class 3	Class 4
EUC Band 1	0	0	95047.68	2307702
EUC Band 2	0	0	93516.15	1365649
EUC Band 3	0	0	45602.1	273208.3
EUC Band 4	0	0	63481.6	16410
EUC Band 5	0	0	45461.22	6498.8
EUC Band 6	136.17	0	19483.38	41882.3
EUC Band 7	0	0	0	0
EUC Band 8	468.86	0	4175	0
EUC Band 9	489.43	0	31.28	0

Worked example

UIG Calculation & Allocation example

Total LDZ

Throughput	Class 1	Class 2	Class 3	Class 4	
EUC Band 1	0	0	142571.5	3425400	
EUC Band 2	0	0	133150.3	1595068	
EUC Band 3	0	0	51726.44	600069.1	
EUC Band 4	0	1205.68	65574.4	25380.8	
EUC Band 5	98.26	6631.24	45461.22	57307.6	
EUC Band 6	477.87	43871.9	19483.38	59923.25	
EUC Band 7	1025.95	14649.32	2303	1523.88	
EUC Band 8	2511.41	3920.1	6346	0	
EUC Band 9	1921.68	242.25	35.02	10.2	
	6035.17	70520.49	466651.3	5764683	6307890

Step 5 Apply weighting factors to Total LDZ Energy.

Once the weighting throughput for Total LDZ has been calculated this is totalled the provide a Total LDZ Weighted Value.

Microsoft Excel Worksheet

Worked example

UIG Calculation & Allocation example

Shipper A

% LDZ Total	Class 1	Class 2	Class 3	Class 4
EUC Band 1	0	0	0.015068	0.365844
EUC Band 2	0	0	0.014825	0.216498
EUC Band 3	0	0	0.007229	0.043312
EUC Band 4	0	0	0.010064	0.002602
EUC Band 5	0	0	0.007207	0.00103
EUC Band 6	2.16E-05	0	0.003089	0.00664
EUC Band 7	0	0	0	0
EUC Band 8	7.43E-05	0	0.000662	0
EUC Band 9	7.76E-05	0	4.96E-06	0

Step 6 The weighted value in each 'cell' (Step 4), is divided by the Total LDZ Weighted Value (Step 5) to provide what % share of the total UIG will be applied.

Shipper A

UIG Share	Class 1	Class 2	Class 3	Class 4	
EUC Band 1	0	0	98.54513	2392.618	
EUC Band 2	0	0	96.95725	1415.9	
EUC Band 3	0	0	47.28011	283.2615	
EUC Band 4	0	0	65.81752	17.01384	
EUC Band 5	0	0	47.13405	6.737935	
EUC Band 6	0.141181	0	20.20031	43.42343	
EUC Band 7	0	0	0	0	
EUC Band 8	0.486113	0	4.328627	0	
EUC Band 9	0.507439	0	0.032431	0	
	1.134733	0	380.2954	4158.955	4540.385

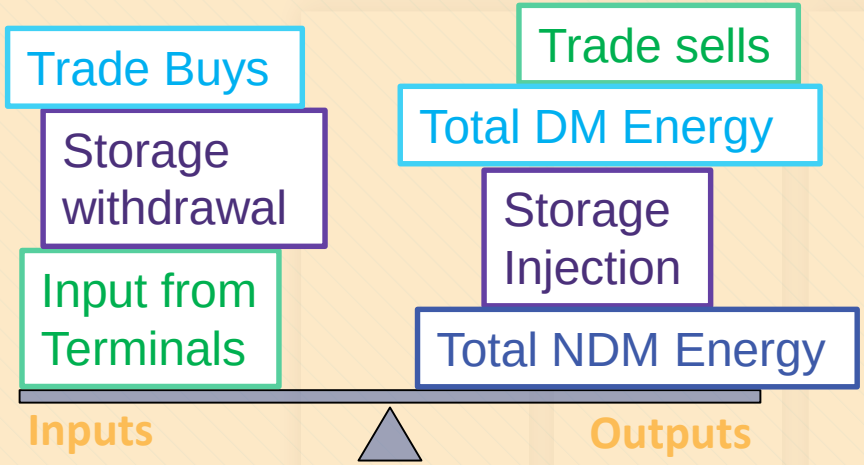
Step 7 The % share (Step 6) is multiplied to the total UIG to provide the amount of UIG apportioned to each EUC Band and Class. This can be totalled to give the total UIG for the Shipper which is shown in Gemini.

Where do I see the UIG charges?

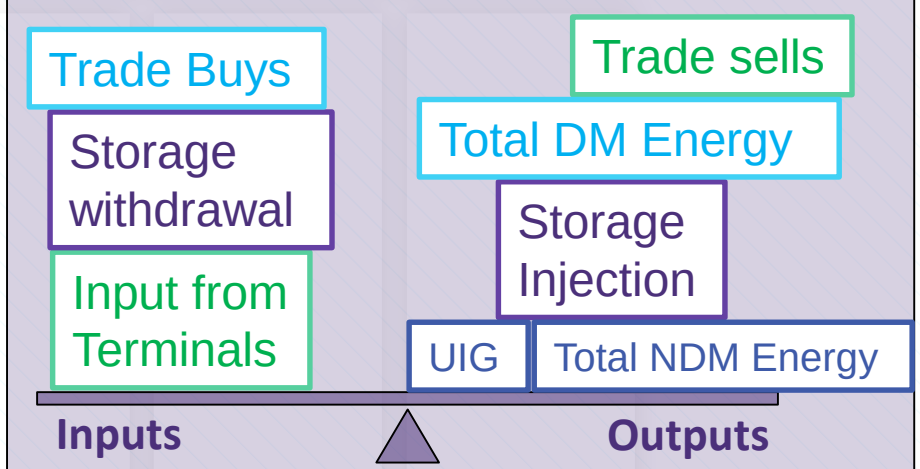
Energy Balancing & Cashout for UIG

Energy Balancing is performed daily to ensure all inputs and outputs from the network are equal and accounted for.

At a high level **Pre Nexus** energy was balanced using the following factors.



At a high level **Post Nexus** energy is balanced using the following factors.



As you can see the main difference is that UIG now appears on the outputs side although the UIG and Total NDM Energy post nexus equates to the Total NDM Energy pre nexus.

Considerations for UIG as Part of EB & Cashout

- As UIG now forms part of a Shipper's overall daily cash out, it is part of the Daily Cashout charges on a Shipper's Energy Balancing Invoice.
- The UIG meter does not appear on the EBI invoice with its own charge type.
- The Shipper's overall daily imbalance is worked out using all input and trades acquired minus all outputs (DM sites, NDM sites**, UIG**) and trades sold which gives the overall imbalance for the gas day and Shipper.
- If the value is positive then the Shipper has over-delivered and they are cashed out at SMP sell price. If the value is negative, they have under-delivered and this is cashed out at SMP buy price.
- Final allocations are used for final imbalance and cash out.
- UIG is on the output side hence effectively closed out at D+5

How does reconciliation affect UIG?

How does reconciliation affect UIG?

Reconciliation relies on actual meter reads being submitted. These reads could either account for (identify) more or less gas than was used in the original UIG calculation, based on the previous actual read.

Therefore each actual read on each site impacts UIG in some way. All these reconciliation values are aggregated by Class, EUC and LDZ. The kWh is also apportioned but is not used to recalculate the financial amount and is a notional value.

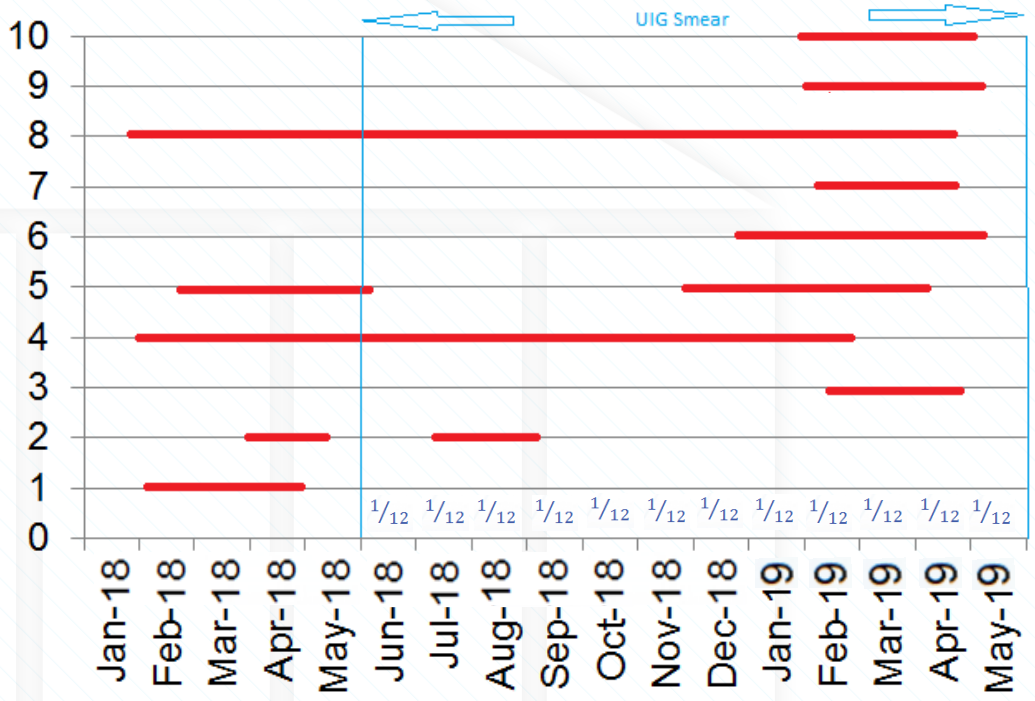
For more information on the Amendments Invoice please refer to https://www.xoserve.com/wp-content/uploads/AmendmentsInvoice.pdf

How does reconciliation affect UIG?

We perform reconciliation on all sites where we have received read(s) in that billing month.

The energy for each site is allovated across the actual reconciliation period (read date - read date) *shown in red*.

The opposite value amends UIG* energy (aggregated at LDZ, Class, EUC level) and is then smeared equally across the previous 12 months *Impact of UIG smear shown in blue*.



How to view UIG on the Amendments Invoices (AMS)

- The **Amendment Invoice (AMS)** is triggered by a number of factors
- There are 52 possible charges which can appear on the Amendment Invoice
- One of the charge types is the **UGR charge/credit**
- The purpose of the UGR charge is to redistribute UIG throughout the network and across all Shipper networks proportionally to their portfolio

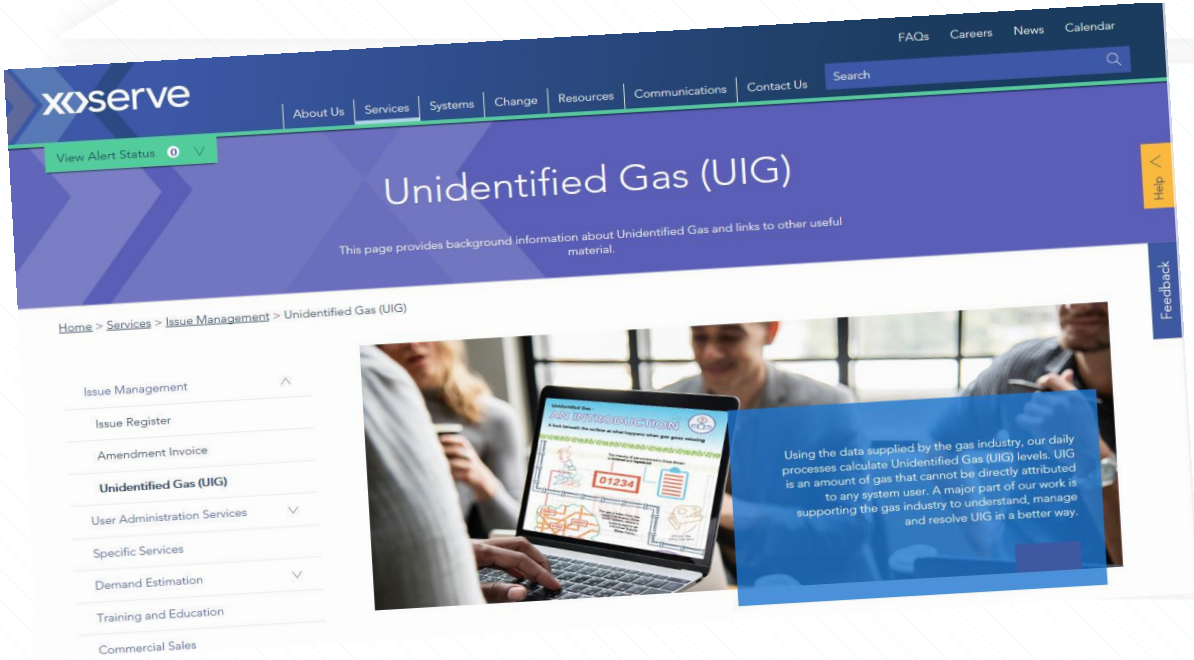
Invoice Files and Supporting Information Files

- AMS invoices are issued as a csv file via the IX on the 18th Business Day of each month
- Each AMS Invoice provides the UGR total charge per Network
- Shippers will receive separate invoices for each Network they operate in
- ASP Core Amendment Invoice Supporting Information file provides a further breakdown of the UGR charges across all Networks.

Where can I get more information on UIG?

UIG Task Force

Xoserve has a UIG Task Force to investigate the root causes and influencers of UIG, with a target of making recommendations for reducing its volatility and scale and to develop a robust predictive model for daily UIG for use by all customers.



Further information is available on Xoserve.com

Useful Links

Document and description	Link
UIG pages on the Xoserve Information Library After launching the Information Library, select Q&A Categories from the title page > select the Unidentified Gas (UIG) tile > view the questions and answers.	https://www.xoserve.com/index.php/our-change-programme/uk-link-programme/uk-link-programme-workstream-updates/uk-link-information-library/
UIG pages on Xoserve.com Multiple documents, including UIG Resolution – Weekly Update, UIG Communications, UIG Events Material, UIG Information and Useful Links	https://www.xoserve.com/xoserve-search?term=uig
AML Supporting Information File Format and File Hierarchy From the UK Link Documentation Library, select UK Link Interface Documents > 3b. System Interface Documents > Shipper	Shipper File Formats Shipper File Hierarchies
Joint Office of Gas Transporters - AUG Statement 20/21 • 28 June 2018 Final Allocation of Unidentified Gas Statement for 2020/21 • 28 June 2018 Final Factor Table Covering Letter	http://www.gasgovernance.co.uk/augenex/2021
UIG values (kWh & %) published weekly From UK Link Secured Documentation, select Folder 18 > Demand Estimation Project Nexus > LDZ Post-Nexus UIG	https://xoserve.sharepoint.com/sites/XEUKLINKDev/Pages/UserDocumentMgmt.aspx
Details of the NDM Demand Formula From UK Link Secured Documentation, select Folder 18 > Demand Estimation Project Nexus > current gas year (e.g. 2018-19 Gas Year) > 4. NDM Algorithms booklet > Section08_18	https://xoserve.sharepoint.com/sites/XEUKLINKDev/Pages/UserDocumentMgmt.aspx

Unidentified Gas (UIG)

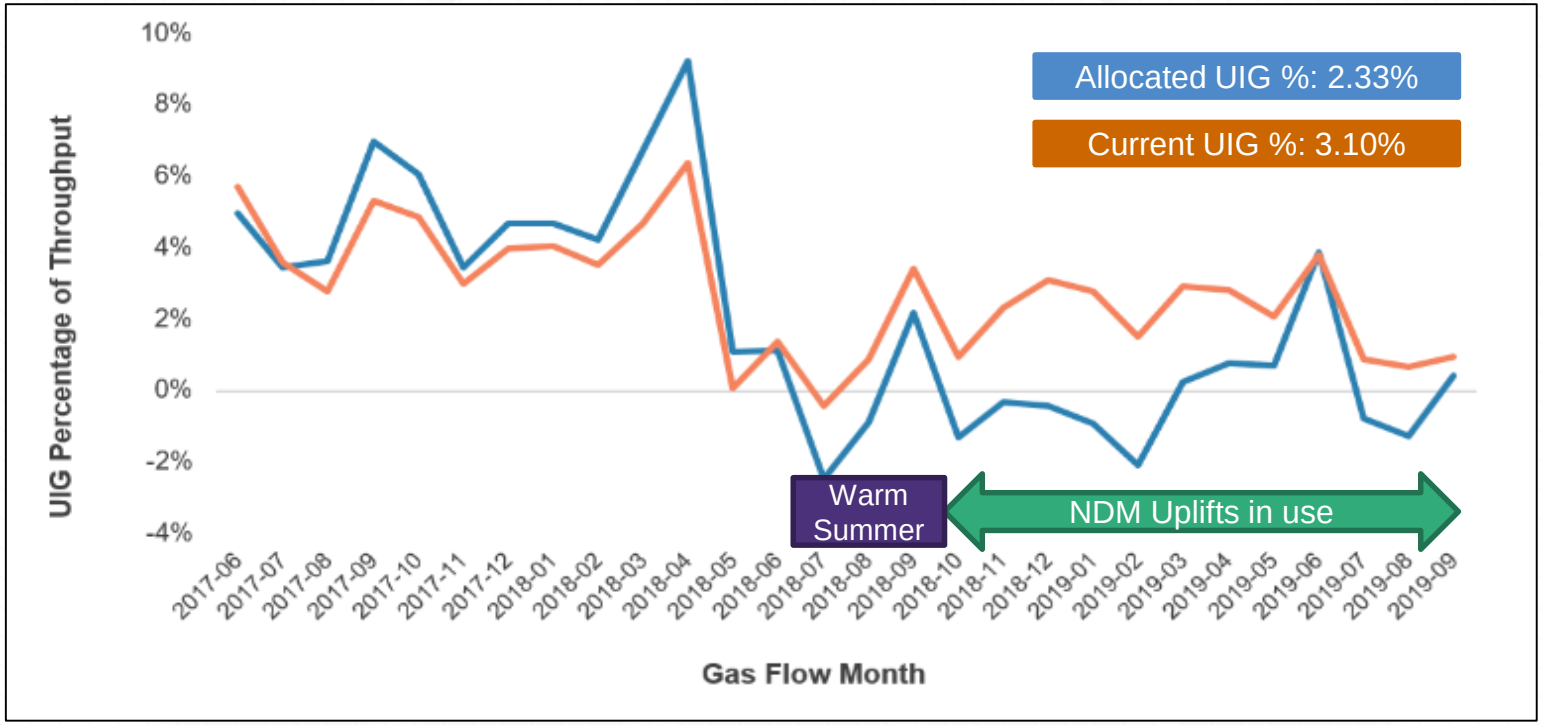
UIG Task Force Update

Xoserve Customer Expert Day

Recent Trends in UIG

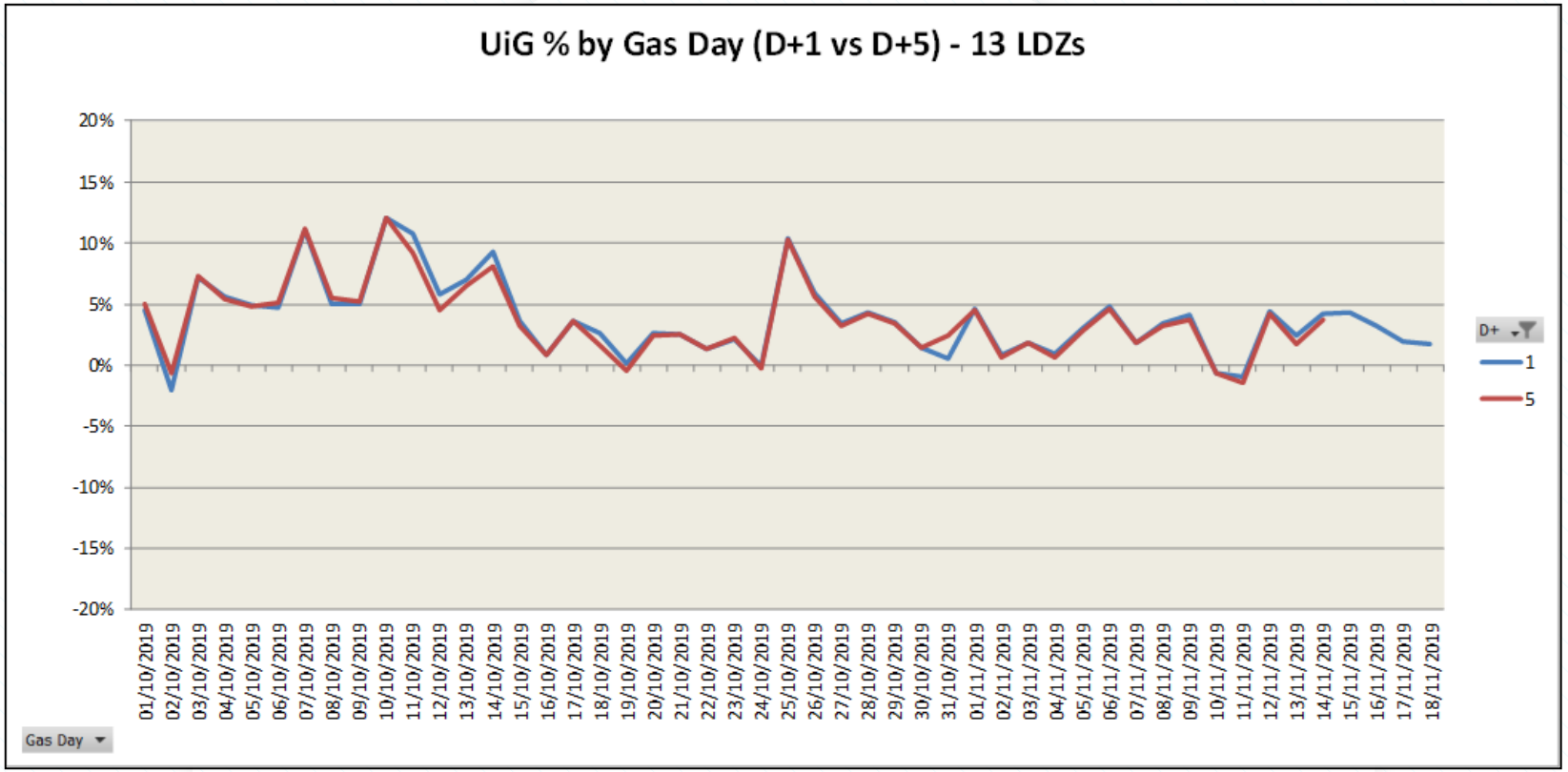
- Additional uplift of NDM Algorithm parameters for Gas Year 2018/19 reduced UIG by around 2% each day
- Reduction was temporary and corrected by Meter Point Reconciliation
- For Gas Year 2019/20 only the Daily Adjustment Factors have been uplifted – no universal uplift of EUC01 NDM allocations – will generally decrease NDM allocation and increase UIG compared to current trends
- The new End User Categories introduced by XRN4665 are now in use for the first time based on Market Sector Code (Domestic/I&C) and on Prepayment meter mechanism/payment type – likely to increase UIG in winter and reduce in summer due to 10% of market being in flatter profiles
- In addition, recent changes to the UIG Weighting Factors as developed by the independent Allocation of Unidentified Gas Expert (AUGE) for this Gas Year will target much more UIG to Class 4 EUC01

UIG as a % of Total Throughput – Original v Latest as at September 2019 Amendment Invoice

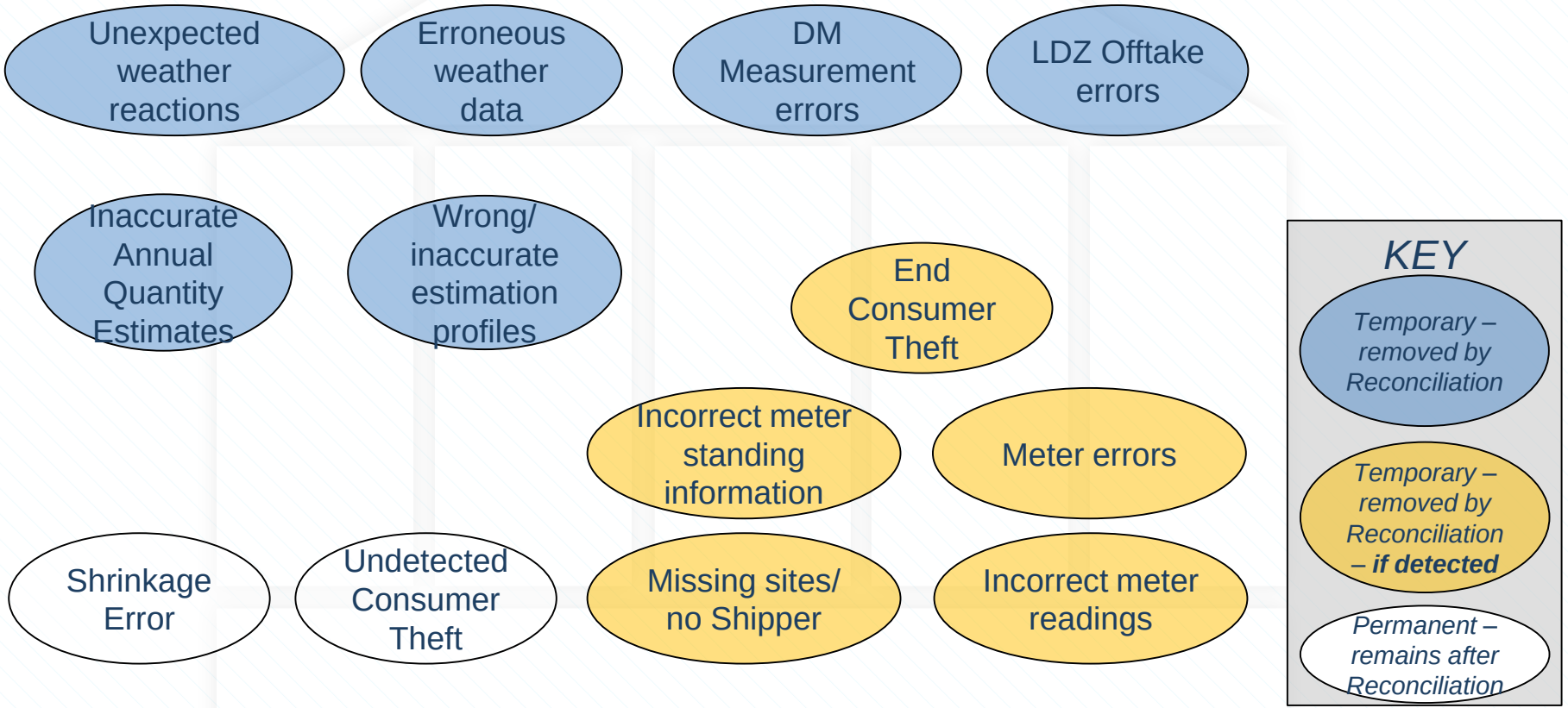


- Graph of national UIG after meter point reconciliations (all Classes) processed up to and including end of September 2019 (28 months)

Daily UIG since start of Gas Year 2019/20



UIG – Some Known Possible/Causes



Key Performance Areas impacting UIG*

96% Class 1 Read Performance Obligation is 97.5%	**68%** Class 2 Read Performance Obligation is 97.5%	**58%** Class 3 Read Performance Obligation is 90%	**457k** sites unread since Nexus Go-Live	**35.1%** Of WAR eligible Annual Quantity (AQ) in Bucket Band
82% Class 4 AQ > 293k Monthly Read Performance	**73%** Class 4 Smart Monthly Read Performance	**92%** Class 4 Annual Read Performance	**24** Class 2-4 MPRNs that should be Class 1	**12,140** MPRNs with suspect Conversion Factors

* performance as per last UIG Task Force Executive Summary

UNC Mods recommended by the UIG Task Force

Mod Number	Description	Status
0681S	Improve quality of conversion factor	Approved
0690S	Reduce qualifying period for Class 1	In Workgroup
0691S	CDSP to convert sites to Class 1	In Workgroup
0692S	Automatic updates to meter read frequency	In Workgroup
0693R	Treatment of kWh error due to standard CF	Review Group established
0699	Incentivise performance using additional UIG charges	In Workgroup
ModXXX	Change maximum meter read frequency to 6 months	Drafted awaiting sponsor
ModXXX	Amend must read obligation for SSPs	Drafted awaiting sponsor

Other UNC Mods which may impact UIG

Mod Number	Description	Status
0664	Transfer Class 2/3 sites with low read performance to Class 4	In Workgroup
0672	Incentivise Class 4 read performance	In Workgroup
0674	Performance Assurance Techniques and Controls	In Workgroup
0711	Update of AUG Table to reflect new EUC Bands	In Workgroup

How can I help mitigate the impacts of UIG?

How to mitigate impact on UIG

UIG calculations relies on accurate and up to date information. This not only assists in the accurate allocation of energy for this sector, but also having the most up to date information helps to reduce a greater impact at reconciliation. The entire industry can mitigate these impacts by working together and …

- Review accuracy of AQs and complete adjustments where required
- Promptly registering Shipperless/unregistered sites
- Supplying regular accurate reads, in line with read frequency, for NDM meter points
- Timely notification of meter asset exchanges/updates
- Using the Class 2 product for larger NDM LSP sites where appropriate and submit daily reads
- Support NDM Demand Estimation modelling by enhancing sample data, especially for smaller LSP market
- Continuing to be diligent in managing consumer theft of gas
- Correct Domestic or Industrial & Commercial flag used
- Ensure timely resolution of requests to Xoserve
- Managing changes and defects to support activities feeding into UIG.
- Supply accurate DM Nominations as early as possible each day
- Timely notification of meter asset exchanges/updates
- Support site set-up investigations, including timely site visits
- Gas Transporters continue to review accuracy of LDZ offtake equipment to minimize errors